

CLIMATE CHANGE, PEAK OIL AND COMMUNITIES

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CLIMATE CHANGE, PEAK OIL AND COMMUNITIES

John URRY

Fred Pearce: 'The big discovery is that planet Earth does not generally engage in gradual change. It is far cruder and nastier'

Marx and Engels wrote that modern bourgeois society: 'is like the sorcerer, who is no longer able to control the powers of the nether world whom he has called up by his spells'¹.

Nicholas Stern: 'Climate change...is the greatest and widest-ranging market failure'².

Anthony Giddens: 'Climate change differs from any other problem that, as collective humanity, we face today. If it goes unchecked, the consequences are likely to be catastrophic for human life on earth'³.

INTRODUCING EPOCHALISM

In an interesting recent paper Mike Savage examines and critiques 'epochalism' in contemporary British sociology⁴. Such epochalist thinking presupposes a distinct narrative of the past which is to be contrasted with the new, distinct and epochal present. He maintains that the emphasis upon 'newness' is particularly influential amongst British sociologists (Albrow, Featherstone, Giddens, Urry) or those working within Britain (Bauman, Lash, Sennett). Such epochalism can be seen from the 1980s onwards in the overlapping notions of Post-Fordism, disorganized capitalism, individualization, reflexive modernity, globalization and the network society.

I examine how certain commentators, scientists and the occasional social scientist are advocating analyses of various futures including future catastrophes. In particular, many catastrophist analyses draw out how various systems set in place during the *twentieth* century contain the seeds of their own destruction. These analyses are anti-evolutionary and dystopic. Some authors consider that the twentieth century (at least in the rich North) was a short period in human history; and that there are no guarantees that the increasing prosperity, wealth, movement, knowledge and connectivity of that period (in the rich North) will continue.

Various analysts have been examining how that twentieth century legacy could come to a shuddering halt with the societies of the rich North 'reversing' or 'collapsing'. The general features of this were explored in Joseph Tainter's classic *The Collapse of Complex Societies* from the late 1980s⁵. This examined how societies become more complex often as a response to short term problems, how that complexity demands ever greater high quality energy, how that increased energy produces diminishing returns, and how there is growing concatenation of problems which can reinforce each other unexpectedly and unpredictably across domains.

Strikingly in the first few years of this century such catastrophist thinking has mushroomed, there is a veritable change of *zeitgeist*. This new catastrophism is developed *inter alia* in *Our Final Century*⁶, *The Party's Over: Oil, War and the Fate of Industrial Society*⁷, *The Next World War: Tribes, Cities, Nations, and Ecological Decline*⁸, *Collapse: how societies choose to fail or survive*⁹, *The Revenge of Gaia*¹⁰, *When the Rivers Run Dry*¹¹, *The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization*¹², *The Long Emergency: Surviving the Converging Catastrophes of the 21st Century*¹³, *The Next Catastrophe*¹⁴, *Field Notes from a Catastrophe*¹⁵, *With Speed and Violence. Why Scientists fear Tipping Points in Climate Change*¹⁶, *Winds of Change: Climate, Weather and the Destruction of Civilizations*¹⁷, *Meltdown*¹⁸ and *World at Risk*¹⁹. Related doomsday scenarios are also becoming common amongst novelists²⁰ and filmmakers²¹.

Jared Diamond maintains how environmental problems have in the past brought about the 'collapse' of societies²². Populations grew and stretched natural resources, particularly energy resources, to breaking point, especially when such societies were at the very height of their powers. He suggests that in the twenty first century human-caused climate change, the build-up of toxic chemicals in the environment and energy shortages will produce abrupt, potentially catastrophic decline. Such a catastrophe would consist of increases of global temperatures that make much plant, animal and human life impossible, the running out of oil and gas, the increased lack of resilience of many societies, a global failure of economy and finance, population collapse, increasing resource wars, and huge food shortages. In short these could constitute a perfect storm analogous to the 'societal collapse' that happened to the Roman Empire or the Mayan civilization. In these cases internal contradictions working slowly and imperceptibly over time brought down apparently dominant systems based upon the availability and deployment of extensive energy²³.

And more generally there is currently developing increasing interest in the 'fall' of civilizations in part under the influence of 'complex systems' thinking in which small changes can tip large systems over the edge, over a threshold so that there are 'runaway' changes away from systems in equilibrium. As Tainter wrote: 'however much we like to think of ourselves as something special in world history, in fact industrial societies are subject to the same principles that caused earlier societies to collapse'²⁴. Elsewhere other commentators are examining the current period of human history as being an anthropocene. This developed from around 1800 and involves soaring carbon dioxide levels, a quantum step upward in erosion, widespread species extinction, ecosystem disturbance, and ocean acidification. The Earth moved in a fundamentally new direction, the anthropocene, and this may also be a finite period in human history that will in due course be replaced by another geomorphological period.

So in the rest of this paper I examine some lineaments of new epochalist thinking. During the long twentieth century resource-dependence came to be forgotten. It seemed that 'societies' had been able to spin off and break free from their resources. Social science colluded with the modern world in promoting the notion that there is an endless supply of 'free lunches' and there are no finite limits and perverse consequences that flow from using and exploiting the world's resources

(rather analogous to how finance behaved over the last two decades; see below). In the analysis of the post-modern, disorganized capitalist epoch, what Bauman writes of as 'liquid' everything, seemed to regard the social as 'infinite', without limits and without costs or consequences, with no resources that are finite and whose effects mean that they are well able to 'bite back'²⁵, especially because of the potential for the concatenation of these multiple processes that is central to examining their catastrophic potential, as Homer-Dixon argues.

HIGH CARBON

First, twentieth century capitalism was increasingly based upon a high carbon 'economy' and a high carbon 'society'. Capitalism generated exceptional powers through new forms of excessive mobility and forms of consumption which undermined the long-term forces of production²⁶. Five resource-intensive systems, interdependent with each other, produced a powerful locked-in high carbon legacy of the twentieth century: electric power and national grids; the steel-and-petroleum car (over 650m cars) and associated roads and 'sprawling' infrastructure; suburban housing filled with household consumption goods; technologies that network geographically dispersed colleagues, friends and families; and the proliferation of many specialized leisure sites, fast food, parks and stadia, all necessitating long distance travel.

These interdependent high carbon systems and associated social practices were a product of American capitalism. Through these systems and military power 'the USA shapes the world'²⁷. Moreover, it is impossible for the rest of the world to have anything like the same scale or share of the world's resources. The US accounts for one third of global wealth, 22% of world energy consumption and one quarter of total carbon emissions, while its population is only 5%²⁸. Even the rich EU bloc consumes energy and resources at only half the American scale²⁹. American capitalism's ultra-high carbon footprint is only possible through monopolizing much of the world's resources.

This was enhanced in the last quarter of the last century via 'neo-liberalism' which transformed one economy and society after another³⁰. It elevates market exchanges over and above all other sets of connections between people, and asserts that the 'market' is the source of value and virtue. Such neo-liberalism enabled American companies to dominate world markets. The US remade the world in its image through scores of bases worldwide, overt military power, think tanks, advisers, consultants, and US-dominated international organisations such as the IMF and World Bank. According to an insider the principal value promulgated through neo-liberalism was: 'to inspire us all to consume, consume, consume. Every opportunity is taken to convince us that purchasing things is our civic duty, that pillaging the earth is good for the economy'³¹. As a result: 'capitalism could come to a sticky end... Capitalism as a growth economy is impossible to reconcile with a finite environment'³².

RISING TEMPERATURES

Relatedly high carbon twentieth century capitalism resulted in global temperatures rising over the past century by at least 0.74°C . This appears to be the result of higher levels of greenhouse gases in the earth's atmosphere³³. Such greenhouse gases trap the sun's rays. As a result of this 'greenhouse' effect the earth warms. The scientific evidence for climate change is less uncertain than when the first Intergovernmental Panel on Climate Change (IPCC) Report appeared in 1990. By the 2007 Report the IPCC the warming of the world's climate is now 'unequivocal', based upon extensive observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea levels.

The IPCC Report further shows that carbon dioxide is the most important of the human-produced or anthropogenic greenhouse gases. Its concentration levels exceed by far the natural range identified over the past 650,000 years and thus the high and rising levels stem from 'non-natural' causes.

With 'business as usual' and no significant reductions in high carbon systems, the stock of greenhouse gases could treble by the end of the century. The Stern Review states that there is a major risk of more than a 5°C increase in temperatures by 2100 and this would transform the world's physical and human geography. There would be a 5-20% reduction in world consumption levels³⁴. Even a temperature worldwide increase of 3°C overall is beyond known experience and would totally change temperature patterns, rainfall, crops, animals and life worldwide.

Through the IPCC the organised actions of thousands of scientists across the globe have transformed public debate especially since 2005 onwards. This organised 'power of science' is probably unique in its mobilising of actions and events around the perceived crisis of global climate change³⁵. However, there is still huge uncertainty as to the scale, impact and speed of future climate changes. The Global Climate Models used to predict rates of greenhouse gases and temperature increases contain very many 'unknowns', what Beck terms the 'inability-to-know'³⁶. Such apparent warming is not a single process. There are many elements: increase in arctic temperatures, reduced size of icebergs, melting of icecaps and glaciers, reduced permafrost, changes in rainfall, reduced bio-diversity, new wind patterns, more droughts and heat waves, and more frequent tropical cyclones and other extreme weather events. According to Busch climate change is a wicked problem for science³⁷.

The IPCC Reports are based on reaching a complex scientific and political consensus and do not factor in all the potential and more uncertain feedback effects. As world temperatures increase over the next few decades, so these increases will almost certainly trigger *further* temperature rises as the earth's environmental systems are unable to absorb the original increases³⁸. The most dramatic of these positive feedbacks would involve the whole or partial melting of Greenland's ice cap which would change sea and land temperatures worldwide, including the possible turning off or modification of the Gulf Stream. Likewise climate change has led to the first

recorded melting of the Siberian permafrost with the potential release of billions of tons of the most powerful greenhouse gas, methane³⁹. Climate change produces climate change since: 'there is no large negative feedback that would countervail temperature rise'⁴⁰.

Moreover, recent ice core research shows that in previous glacial and inter-glacial periods abrupt and rapid changes occurred in the earth's temperature. Earth does not engage in gradual change⁴¹. Rapid changes have been the norm not the exception. Moreover, temperatures at the time of the last Ice Age were only 5°C colder than they are now. And in the Arctic recent increases in temperature have been marked with feedbacks creating local warming of 3-5°C over the past thirty years.

Thus various diverse yet interconnected changes within the earth's environmental systems could create a vicious circle of accumulative disruption occurring, as Pearce expresses it, 'with speed and violence'. The World Health Organisation calculated as early as 2000 that over 150,000 deaths are caused each year by climate change, such changes being global, cross generational and highly unequally distributed around the world⁴². Parts of the global 'south' already show signs of climate change transformation. Bangladesh in the low lying Ganges is the country worst affected and yet produces tiny levels of carbon emissions. These emerging global relationships have been termed 'climatic genocide' with millions being forced to migrate away from global climate change risks mainly experienced in the poor 'south'⁴³. The planet will endure but many forms of human habitation may not. James Hansen, who had been President Bush's main climate change adviser, states: 'We are on the precipice of climate change tipping points beyond which there is no redemption'⁴⁴. After a brief window of opportunity the various 'human activities' that are generating increased carbon emissions will make further warming of the planet inevitable *and* possibly catastrophic. This 'revenge of Gaia' is engendering 'global heating' the planet⁴⁵.

PEAK OIL

There are many ways in which today's high carbon economy and society are deeply dependent upon, and embedded into, abundant cheap oil. Most industrial, agricultural, commercial, domestic, and mobility systems are built around the plentiful supply of such 'black gold'. As Homer-Dixon notes: 'o[il] powers virtually all movement of people, materials, foodstuffs, and manufactured goods – inside our countries and around the world'⁴⁶. It provides 95% of transport energy. It is remarkably versatile, convenient and during the twentieth century relatively cheap. Hence 'The Great Addiction' [to oil] remained as it became vital to virtually everything done and especially to everything that *moves* on the planet. This oil-based infrastructure was a twentieth century phenomenon with the US as the disproportionately high energy producing and consuming society⁴⁷.

But the peaking of oil supplies occurred in the US as far back as 1970, famously predicted by Hubbert in 1956⁴⁸. The US now imports 60% of its oil and this may rise to 75% by 2030⁴⁹. Worldwide the largest oilfields were discovered over half a century ago, with the peak of oil discovery being in the mid-1960s. There have been

no huge new discoveries since the 1970s. All but two of the world's 100 largest oil fields date from before 1970. Strahan refers to the 'imminent extinction of petroleum man' since for every barrel of oil now being discovered, three to four are consumed⁵⁰. Oil production worldwide may peak by around 2010 although this is hugely contested. There is a very pronounced rate of decline in production once an oil field is over its peak and most oilfields now are. Many commentators think that it will be difficult to raise the current production of oil much above the current output of 86m barrels per day⁵¹.

Moreover the foreign policies of many high consuming states being significantly driven by global oil interests. In the US the desire to access oil sources from outside the US since the decline in domestic oil production has resulted in its subjugation of Middle Eastern oil interests in the name of the 'freedom' of its citizens to drive and to heat/air-condition their homes⁵².

Energy will almost certainly become increasingly expensive even with a long term global depression and there will be increasingly frequent shortages⁵³. This is especially so with the world's profligate consumption of oil to move almost everything including water, in its use of oil in almost all manufacturing and agricultural processes, and in the exceptional rate of current and future urbanisation. There is not enough oil to fuel such worldwide systems with experts estimating that global consumption would, with 'business as usual', need to double by 2050⁵⁴. Geopolitical instabilities in many oil producing countries are simultaneously increasing fluctuations and de-stabilisations in oil supply and doubts about future energy security. Even relatively minor fluctuations result in oil price spikes and resulting protests both for and against cheap oil⁵⁵.

One new politics of oil can be seen in the Transition Towns movement which seeks to move the world from 'oil dependency to local resilience'. This movement seeks to develop policies to deal with the global significance of the ending of the 'petroleum interval' in human history, which may well be just a brief century or so. This Age of Easy Oil occurred between the first discovery of oil in 1859 and its probable demise in the early decades of this century⁵⁶.

Overall James Kunstler considers the catastrophic system effects of such peaking of oil: 'At peak and just beyond, there is massive potential for system failures of all kinds, social, economic, and political. Peak is quite literally a tipping point. Beyond peak, things unravel and the center does not hold. Beyond peak, all bets are off about civilization's future⁵⁷.

URBAN POPULATIONS

The world's population is growing by about 900 million per decade, the largest absolute increases in human history⁵⁸. By 2000 the world population passed 6 billion and is expected to reach 9.1 billion by 2050, if one or more catastrophes do not intervene by increasing death rates and reducing the scale of globalisation. In 2005 urban dwellers already numbered 3.2 billion, about half of the world's population⁵⁹. The world went urban on May 23rd 2007⁶⁰. We now inhabit an 'urban planet'.

Rapid population growth in developing countries exposes populations to many hazards, shortages of clean drinking water and sanitation as well as rising air pollution and air-borne toxins. Most mega-cities within developing countries fail to meet WHO (World Health Organization) standards for air quality. Rising populations also add to the global consumption of energy and raw materials, as well as environmental carrying capacity, leading towards further resource depletion. Cities consume three-quarters of the world's energy and are responsible for at least three-quarters of global pollution⁶¹.

Overall where cities were once viewed as the cradle of civilisation, they now produce disastrous social inequalities, environmental decline and 'global slums'⁶². Davis notes how: 'the cities of the future, rather than being made out of glass and steel...are instead largely constructed out of crude brick, straw, recycled plastic, cement blocks, and scrap wood...much of the twenty-first-century urban world squats in squalor, surrounded by pollution, excrement, and decay'⁶³. These are the places of dwelling for at least 1 billion people. And they are also places of death with poor levels of public transportation and high use of cars. The result is 'sheer carnage' with 1 million people killed in road accidents each year in Third World cities, many of those victims never owning a car⁶⁴.

FOOD AND WATER

There are increasingly significant problems of food and water security. Much food production depends upon hydrocarbon fuels to seed and maintain crops, to harvest and process them, to transport them to market partly because of the exceptional food miles that have come to be involved in diets in the rich North⁶⁵. If oil shortages develop: 'food could be priced out of the reach of the majority of our population. Hunger could become commonplace in every corner of the world, including your own neighborhood'⁶⁶. There will be food protests as a result of likely flooding, desertification and generally rising costs, as well as the tendency for 'rich' societies to buy up land in 'poor' societies to ensure their own food security (as Qatar is now doing).

There are also growing insecurities in supplying clean usable water. There are huge demands from growing populations, especially those in mega-cities that have to both buy and transport, using carbon-based systems, their water from outside. A global temperature increase of 2.1 degrees would expose up to 3 billion people to water shortages⁶⁷. Some commentators now refer to 'peak ecological water', only 0.007% of water on Earth being available for human use⁶⁸. Already severe water shortages face one third of the world's population. As a further convergence of oil impacts upon the environment, whatever oil does to the water and land, it also does the same to the earth's atmosphere.

FUTURES

I have outlined five very significant processes that are impacting upon human societies and likely to shape their future. Each concerns the resource-base of societies and derives from various social institutions and practices. How social life has come to be organised determines the scale and impact of such resource-use and how consequences may ensure that are in part at least 'perverse'. How we might

thus ask will historians of the future refer to the next few decades? Will they be known as the climate change years or maybe the 'end of civilization' years or merely 'business as usual' years? Will it be a new epoch or a continuation of the old?

We can begin by noting that October 2008 has already put epochal change on the agenda. Commentators had not presumed that the world's production, financial, real estate, consumption and income systems could be rapidly reversed⁶⁹. Systems had often been thought of as like oil tankers which take an inordinate time to set onto a different course. But the world economy-society showed no such properties. It seems to have flipped over, from increasing prosperity and richer lives for many in the prosperous north to increasing misery for most. A set of tipping points were encountered and at breakneck speed all that had been presumed 'solid' about the world economy-society 'melted into air', to use Marx's terminology from the *Manifesto of the Communist Party*. This has been an extraordinary turnaround in human history, a turnaround that those in the rich north never expected to see and experience, although other parts of the world have experienced massive financial reversals within the previous decade or two⁷⁰. Lives had been premised upon increasing incomes, wealth, security, movement, knowledge, wellbeing and longevity. This was the dream of the modern epoch apparently been set in stone in the rich North since 1945. And yet there can be a reverse gear.

This turnaround came about through certain interdependencies between systems which are not 'silos'. It is necessary to examine how these different processes develop, how they interconnect and especially how they may concatenate? What some authors are examining is how such processes could catastrophically impact upon each other, through their concatenation. This occurred on a local scale in New Orleans in September 2005, a place like many others built close to the sea and threatened by extreme weather events⁷¹. More generally states are often unable to cope with oil shortages, droughts, heatwaves, extreme weather events, flooding, desertification, highly mobile diseases and the potential forced movement of up to 200 million environmental refugees⁷². States have to deal with such concatenating processes although their tax revenues have been reducing because of the proliferation of offshored tax havens designed to avoid or evade tax payments, and more generally of what Palan terms *The Offshore World*⁷³.

Overall rising energy consumption and efficiency has been a major source of expanding income and wealth around the world. Oil came to be embedded within the development of the high carbon economy and society, necessary for and simultaneously enhancing its increasing complexity.

But with possibly reduced energy and the effects of climate change world consumption levels and income will fall, as has happened every time oil price increases have occurred over the past half century. There could be a profound 'de-globalisation'. When oil production goes past peak, so too may the size and effectiveness of the world economy and society⁷⁴. Such a 'contraction' in human affairs would open up opportunities for more revitalised and cooperative community-based social relations. James Kunstler predicts that: 'the twenty-first century will be much more about staying put than about going to other places'⁷⁵. In extreme post-

peak oil scenario the use of a car may be seen as a luxury so creating resentment amongst those unable to drive because of oil shortages. This could lead to cars being vandalized or drivers being subject to abuse. Kunstler maintains that the future will involve comprehensive downscaling, downsizing, re-localizing and the radical reorganization of lifestyles in the rich north. He states that: 'Anyway one might imagine it, the transportation picture in the mid-twenty-first century will be very different from the fiesta of mobility we have enjoyed for the past fifty years. It will be characterized by austerity and a return to smaller scales of operation in virtually every respect of travel and transport. It will compel us to make the most of our immediate environments', although this will only be possible for a significantly smaller world population⁷⁶.

By contrast a more catastrophic future would envisage the concatenation of climate change, future, oil, gas and water shortages and intermittent wars leading to the substantial breakdown of many mobility, energy and communication connections that straddle the world. There would generate a plummeting standard of living, a re-localization of mobility patterns, an increasing emphasis upon local 'warlords' controlling recycled forms of mobility and weaponry, and relatively weak national or global forms of governance. There would be no monopoly of physical coercion in the hands of national states. Systems of repair would dissolve with increasingly localized recycling of bikes, cars, trucks and phone systems. Much of the time they would not be working. Cars and trucks would rust away in the deserts or would be washed away in floods. Certain consequences of climate change may partially rectify themselves as oil and other resource use declines and world population may plummet.

Systems of secured long range mobility would disappear except for the super-rich. Rather like Mediaeval times long distance travel would be extremely risky and probably not attempted unless armed. The rich would travel mainly in the air in armed helicopters or light aircraft. Each warlord dominated region would potentially be at war with their neighbours, especially for control of water, oil and gas. With extensive flooding, extreme weather events and the break-up of long distance oil and gas pipelines, these resources would be contested and defended by armed gangs. Those who could live in gated and armed encampments would do so, with the further neo-liberal privatizing of many collective functions.

One reaction to such a global contraction of resources would be for richer nations to break away from poorer nations into protected enclaves. Outside such fortified enclaves there would be increasing 'wild zones' from which the rich and powerful would exit as fast as possible, if and when the oil or water no longer flows. Such wild zones would be left to ethnic, tribal or religious warlordism, to the multitudes that from time to time re-enter safe zones as migrants or as slaves or as terrorists. In such a Fortress World:

the elite retreat to protected enclaves, mostly in historically rich nations, but in favoured enclaves in poor nations, as well... Technology is maintained in the fortresses... Local pollution within the fortress is reduced through increased efficiency and recycling. Pollution is also

exported outside the enclaves, contributing to the extreme environmental deterioration induced by the unsustainable practices of the desperately poor and by the extraction of resources for the wealthy⁷⁷.

This Mad Max 2 scenario involves 'walled cities' similar in some ways to those in the medieval period so as to provide protection against raiders, invaders and diseases. Many video games present versions of this scenario, such as Supreme Ruler 2020. Mad Max 2 famously depicts the future through a bleak, dystopian, impoverished society facing a breakdown of civil order resulting from oil shortages and where power rests with those able to improvise new mobilities including short term flight⁷⁸.

A further scenario involves the 'digitisation' of each self and the integration of multiple databases (what China calls the 'Golden Shield'). Such a system of tracking and tracing would involve noticeable changes to the very fabric of social life, freedom of movement and lifestyles. There would be the digital 'Orwellian-isation' of self and society, with more or less no movement without digital tracing and tracking, no-one legally beyond or outside the control of digital networks. This Orwellian scenario presupposes various existing and emergent digital technologies: CCTV cameras; data mining software; biometric security; integrated digital databases; the embedding of digital processing within the environment and moving vehicles; Radio Frequency Identity (RFID) implants to track objects and people; automated software systems; smart code space to determine the route, price, access and speed of vehicles; DNA databases; and technologies to track and trace each person's carbon allowances and carbon expenditures⁷⁹. Many of these are already being introduced, so much so that the UK Government's Information Commissioner says that people in Britain already live in a surveillance society⁸⁰.

This digital self transforms the nature of the individual person. Already many states are seeking to integrate different databases that contain 'private' information on each person. This further extension would link that information with data on each person's actual and planned movement. This would limit the 'freedom' to walk, drive or move without record and without connections being made with much other information held about that person. People and their movement will become recorded, classified, charged and allowed or prevented from moving into different zones.

CONCLUSION

So I have shown that a striking new set of epochal writings have come to develop. These are all concerned albeit in different ways with resource use and the potential for various forms of 'catastrophic' consequence. And social science neglected such issues through its notion of the *modern* world in which it was presumed that societies had 'solved' the problems of resources, that especially science and technology put to work within capitalist relations of production was continuously able to overcome 'limits'. There were no 'limits to growth'.

I then argued that it was necessary to examine processes of high carbon, climate change, the peaking of oil, population increases and the (in)security of food and

water, and especially to determine the social practices presupposed by and made possible through these (and related resource) processes. What is especially significant is to examine the potential for the concatenation of these multiple processes which could escalate and produce unexpectedly severe and catastrophic futures.

And the recent global financial and economic crisis of 2007-9 shows that the private pursuit of individual gain around the world can well result in collective outcomes that threaten the very future of capitalism. In September 2008 the value of the world's financial assets had grown to a staggering \$160 trillion, 3.5 times the value of world GDP⁸¹. The pursuit of individual gain thus produced what most now understand as an economy that was hugely over-financialised, where the balance between the real and financial economies was contradictory.

Moreover, this was not simply a financial crash; it was not the result of just what was happening in the financial 'silo'. The Great Crash seems to have been activated in part by the speculative building and risky funding of extensive tracts of 'marginal' suburbs and related shopping and leisure developments within the US. Many US suburbs from the 1980s onwards were built distant from city centres and not connected by mass transit. These suburbs thus depended upon car travel and hence upon cheap oil for people's work, leisure and social life. And the housing has been extensively 'sold' to people with 'sub-prime' employment, credit and housing histories. These sub-prime suburban tracts were *Driven to the Brink* by oil dependence and oil price spikes from 2005 onwards⁸². This extreme event rocked the unstable US housing-finance system that was in a state of self-organised criticality. So the real economy bit back; resources it turned out do matter. My argument more generally here is that there is significant potential for what Homer-Dixon terms 'synchronous failure' engendered by 'extreme events' (black swans) that brings about the 'convergence of stresses that's especially treacherous'⁸³. They may all come about and reinforce each other at more or less the same time.

There are two implications to mention by way of conclusion. First, according to Sassen there is a need for a massive restructuring of capitalism, to develop into what elsewhere I term 'resource-capitalism', a real economy able to deliver security, stability and sustainability. Such a post neo-liberal epoch of resource-capitalism would involve placing massive limits upon the form, scale and character of economic and social practices and especially on the degree of financialisation. The long term forces of production should be regarded as *the* basis of economies and societies. Resource capitalism involves ensuring the long term viability of the earth's resources which capitalist economies/societies deploy and depend upon⁸⁴. Such a reformulated capitalism would reduce some of the potential for catastrophic outcomes. This more generally relates to the failure of most economics to examine the impact of energy upon economic growth, often treating such resources as a more or less free good rather than as crucially significant and needing to be sustained in the long term⁸⁵. They we now realise are not free goods at all.

Second, social science in a way replicated and reproduced a world where resources and especially energy were free goods and unimportant for deciphering the lineaments of change and development. But that was the twentieth century. Now we

are in a new epoch, in the new century the world looks very different indeed and issues of resource depletion, contestation and collapse will be haunting it and in some potentially catastrophic decades to come.

¹ Karl Marx and Friedrich Engels, *The Manifesto of the Communist Party* (Moscow: Foreign Languages, [1848] 1888), p. 58.

² Nicholas Stern, *Stern Review: The Economics of Climate Change* (London: House of Commons, 2006), p. 1. Significantly this Review ignores the other major market failure, namely the using up and probable extinction of oil.

³ Backcover, Anthony Giddens, *The Politics of Climate Change* (Cambridge: Polity, 2009).

⁴ Mike Savage, 'Against epochalism: an analysis of conceptions of change in British sociology', *Cultural Sociology*, 3: 217-38.

⁵ Joseph Tainter, *The Collapse of Complex Societies* (Cambridge: Cambridge University Press, 1988).

⁶ Martin Rees, *Our Final Century* (London: Arrow Books, 2003; he is President of the Royal Society).

⁷ Richard Heinberg, *The Party's Over: Oil, War and the Fate of Industrial Society* (New York: Clearview Books, 2005).

⁸ Roy Woodbridge, *The Next World War. Tribes, Cities, Nations, and Ecological Decline* (Toronto: Toronto University Press, 2005).

⁹ Jared Diamond, *Collapse: how societies choose to fail or survive* (London: Allen Lane, 2005).

¹⁰ James Lovelock, *The Revenge of Gaia* (London: Allen Lane, 2006).

¹¹ Fred Pearce, *When the Rivers Run Dry* (London: Transworld, 2006).

¹² Thomas Homer-Dixon, *The Upside of Down. Catastrophe, Creativity, and the Renewal of Civilization* (London: Souvenir, 2006).

¹³ James Kunstler, *The Long Emergency: Surviving the Converging Catastrophes of the 21st Century* (London: Atlantic Books, 2006).

¹⁴ Charles Perrow, *The Next Catastrophe* (Princeton: Princeton University Press, 2007).

¹⁵ Elizabeth Kolbert, *Field Notes from a Catastrophe. A Frontline Report on Climate Change* (London: Bloomsbury, 2007).

¹⁶ Fred Pearce, *With Speed and Violence. Why Scientists fear Tipping Points in Climate Change* (Boston: Beacon Press, 2007).

¹⁷ Eugene Linden, *Winds of Change. Climate, Weather and the Destruction of Civilizations* (New York: Simon and Schuster, 2007).

¹⁸ Stephen Haseler, *Meltdown* (London: Forum Press, 2008).

¹⁹ Ulrich Beck, *World at Risk* (Cambridge: Polity, 2009).

²⁰ Recent examples include Sarah Hall, *The Carhullan Army* (London: Faber and Faber, 2007); Marcel Theroux, *Far North* (London: Faber and Faber, 2009).

²¹ See the 2004 movie *The Day After Tomorrow*, directed by Roland Emmerich.

²² Jared Diamond, *Collapse: how societies choose to fail or survive* (London: Allen Lane, 2005).

²³ See Thomas Homer-Dixon, *The Upside of Down Catastrophe, Creativity, and the Renewal of Civilization* (London: Souvenir, 2006), chapter 2.

²⁴ Joseph Tainter, *The Collapse of Complex Societies* (Cambridge: Cambridge University Press, 1988), p. 216. See Thomas Homer-Dixon, 'Prepare for tomorrow's breakdown', *Toronto Globe and Mail*, May 14th, 2006.

²⁵ See Zygmunt Bauman, *Liquid Modernity* (Cambridge: Polity, 2000).

²⁶ John Urry, 'Climate change, travel and complex futures', *British Journal of Sociology*, 2008, 59: 261 – 279.

²⁷ See Stephen Burman, *The State of the American Empire. How the USA shapes the world* (London: Earthscan, 2007).

²⁸ Stephen Burman, *The State of the American Empire. How the USA shapes the world* (London: Earthscan, 2007), pp. 16-26.

²⁹ Julian Borger, 'Half of global car exhaust produced by US vehicles', *The Guardian*, June 29th, 2008; John DeCicco, Freda Fung, *Global Warming on the Road* (Washington: Environmental Defense, 2006).

³⁰ See David Harvey, *A Brief History of Neo-Liberalism* (Oxford: Oxford University Press, 2005). Naomi Klein in *The Shock Doctrine* (London: Penguin Allen Lane, 2007), notes that Chicago School

alumni included by 1999 25 Government Ministers and more than a dozen central bank presidents (p. 166)!

³¹ John Perkins, *Confessions of an Economic Hit Man* (London: Ebury Press, 2005), p. xiii.

³² Terry Leahy, 'Discussion of "Global warming and Sociology"', *Current Sociology*, 2008, 56: 475-84: 481; I am not suggesting that other modern economic systems have a 'better' environmental record.

³³ IPCC (2007) <http://www.ipcc.ch/> (accessed 2.6.08); Nicholas Stern, *The Economics of Climate Change* (Cambridge: Cambridge University Press, 2007). See Eugene Linden, *Winds of Change. Climate, Weather and the Destruction of Civilizations* (New York: Simon and Schuster, 2007), pp. 286-304, on the Accelerating Pace of Climate Change and Scientific Discovery.

³⁴ Nicholas Stern, *The Economics of Climate Change* (Cambridge: Cambridge University Press, 2007), p. 3.

³⁵ See Nico Stehr, 'Economy and ecology in an era of knowledge-based economies', *Current Sociology*, 2001, 49: 67-90.

³⁶ Ulrich Beck, *World at Risk* (Cambridge: Polity, 2009), p. 53.

³⁷ See Lawrence Busch, 'Global warming and hot potatoes: how debates over standards shape the biophysical, social, political and economic climate', *Rural Sociological Society*, Madison, Wisconsin, July 2009, as well as Mark Lynas, *Six Degrees. Our Future on a Hotter Planet* (London: Fourth Estate, 2007). See George Monbiot, *Heat. How to stop the planet burning* (London: Allen Lane, 2007) on the contemporary politics of climate change.

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³⁹ <http://www.guardian.co.uk/environment/2005/aug/11/science.climatechange1> (accessed 17.12.2008)

⁴⁰ James Lovelock, *The Revenge of Gaia* (London: Allen Lane, 2006), p. 35.

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⁴⁴ Quoted Fred Pearce, *With Speed and Violence: Why Scientists fear Tipping Points in Climate Change* (Boston: Beacon Press, 2007), p.xxiv.

⁴⁵ James Lovelock, *The Revenge of Gaia* (London: Allen Lane, 2006).

⁴⁶ Thomas Homer-Dixon, *The Upside of Down. Catastrophe, Creativity, and the Renewal of Civilization* (London: Souvenir, 2006), p. 81.

⁴⁷ David Strahan, *The Last Oil Shock* (London: John Murray, 2007), p. 85.

⁴⁸ See David Strahan, *The Last Oil Shock* (London: John Murray, 2007), chap 2.

⁴⁹ Stephen Burman, *The State of the American Empire. How the USA shapes the world* (London: Earthscan, 2007), pp. 26-9.

⁵⁰ David Strahan, *The Last Oil Shock* (London: John Murray, 2007), pp. 62-3.

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